REMARKS

Applicants respectfully request reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow. Claims 1-40, 43, 44, 51, 52, 59, and 60 were previously cancelled. Claims 41, 42, 45, 46, 48, 49, 50, and 53-58 have been amended. Claims 61-75 have been added. Claims 41, 42, 45-50, 53-58, and 61-75 are now pending in this application.

I.   Objection to Claim 55

On page 4 of the Office Action, the Examiner objects to claim 55 because Claim 55 is dependent on Claim 55. Applicants thank the Examiner for noting this discrepancy. Applicants have amended Claim 55 to depend from Claim 54. As a result, Applicants respectfully request withdrawal of the objection to Claim 55.

II.   Rejection of Claims 57 and 58 Under 35 U.S.C. § 101

On page 5 of the Office Action, Claims 57 and 58 were rejected under 35 U.S.C. § 101 as being directed to non-statutory subject matter. On page 5 of the Office Action, the Examiner states that the "claim language does not correspond to the Interim Guidelines for patent Subject Matter Eligibility and MPEP 21 06." Applicants have amended Claims 57 and 58 to include the preamble requested by the Examiner. As a result, Applicants respectfully request withdrawal of the rejection of Claims 57 and 58 under 35 U.S.C. § 101.

III.   Claim scope

On page 5 of the Office Action, the Examiner states:

> The wherein clause stated in the amended independent claims state 'wherein the selected signal constellation consists of a plurality of symbols separated from one another by a maximized minimum conditional distribution that comprises a Kullback-Leibler distance.' No step is being performed in the wherein clause. The clause expresses the result of the step of 'selecting one of several signal constellations based on the determined characteristic'. The data (signal constellations) stored in a storage medium of claim 49

is not a component of the device of claim 49 and therefore does not
limit the claim to a particular structure.

Applicants respectfully disagree. However, Applicants have amended the independent
claims to overcome these arguments presented by the Examiner.

IV. Rejection of Claims 41, 42, 45, 46, 49, 50, 53, 54, 57, and 58 Under 35 U.S.C. § 103(a)

In Section 5 of the Office Action, Claims 41, 42, 45, 46, 49, 50, 53, 54, 57, and 58 were
rejected under 35 U.S.C. § 103(a) as being unpatentable over US Patent No. 6,560,445 to Fette et
al. (Fette), in view of US Patent Publication No. 2003/0210824 to Falzon et al. (Falzon).
Applicants respectfully traverse the rejection of Claims 41, 42, 45, 46, 49, 50, 53, 54, 57, and 58
because Fette and Falzon, alone and in combination, fail to teach, suggest, or disclose all of the
limitations of Claims 41, 42, 45, 46, 49, 50, 53, 54, 57, and 58.

Independent Claim 41, as amended and with emphasis added through underlining, recites
in part:

> selecting a signal constellation from a plurality of signal
> constellations based on the determined characteristic, the selected
> signal constellation including a plurality of constellation points, <u>the
> plurality of constellation points selected by maximizing a
> minimum Kullback-Leibler distance between the plurality of
> constellation points</u>;

Independent Claim 49, as amended and with emphasis added through underlining, recites
in part:

> selecting a signal constellation from a plurality of stored signal
> constellations based on the determined characteristic, the selected
> signal constellation including a plurality of constellation points, <u>the
> plurality of constellation points selected by maximizing a
> minimum Kullback-Leibler distance between the plurality of
> constellation points</u>;

Independent Claim 57, as amended and with emphasis added through underlining, recites
in part:

> select a signal constellation from a plurality of signal constellations based on the determined characteristic, the selected signal constellation including a plurality of constellation points, <u>the plurality of constellation points selected by maximizing a minimum Kullback-Leibler distance between the plurality of constellation points</u>;

On pages 5-6 of the Office Action, the Examiner states:

> Regarding claim 41, Fette discloses a method of transmitting a signal. …. Fette does not disclose the symbols of the signal constellations are separated from one another by a Kullback-Leiber distance. Falzon discloses "minimization of the Kullback-Leiber distance for estimating the parameters of the generalized Gaussian model ensures a minimization of the cost of coding in accordance with information theory" in paragraph 0024. For this reason, it would have been obvious for one of ordinary skill in the art at the time of the invention to combine the teachings of Falzon into the method of Fette.

On pages 6-8 of the Office Action, the Examiner similarly rejects claims 49 and 57. Thus, the Examiner agrees that Fette fails to teach, suggest, or describe a "plurality of constellation points selected by maximizing a minimum Kullback-Leibler distance between the plurality of constellation points" as required by Claims 41, 49, and 57. The Examiner looks to Falzon for this teaching. Applicants respectfully disagree that Falzon provides any teaching of at least a "plurality of constellation points selected by maximizing a minimum Kullback-Leibler distance between the plurality of constellation points" as required by Claims 41, 49, and 57.

On pages 3-4 of the Office Action, the Examiner states:

> Falzon discloses "minimization of the Kullback-Leibler distance for estimating the parameters of the generalized Gaussian model ensures a minimization of the cost of coding in accordance with information theory" in paragraph 0024. Minimizing this term amounts therefore to choosing a model distribution p2, which will produce the most efficient symbols for coding a distribution source p1 (paragraph 0068). Therefore, D(p2||p1) will be minimized (paragraph 0069). The symbols are selected according to a Kullback-Leibler distance. Therefore, the constellation

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points for transmission of those symbols are separated according to that Kullback-Leibler distance.

Applicants respectfully disagree. Contrary to the Examiner's statement, Falzon does not teach that the "symbols are selected according to a Kullback-Leibler distance" nor that "the constellation points for transmission of those symbols are separated according to that Kullback-Leibler distance." In fact, Falzon teaches nothing whatsoever about constellation points or maximization of a value.

Falzon "concerns a method for compressing data, in particular images." (Abstract) Falzon states:

> The example of the invention that will be described below concerns an allocation of rate by subbands. It is carried out in three steps:
>
> First Step: Wavelet Transformation of the Image
>
> This transformation provides a family of wavelet coefficients $W_{jk}[n,m]$ distributed in various subbands, where j denotes the scale of the subband and k its orientation (FIG. 1). The number of indexes n,m for which wavelet coefficients are thus defined depends on the scale of the subband. It is therefore noted n_{jk}.
>
> Consider, for example, an image of size 512x512 pixels of a terrestrial landscape obtained by an observation satellite. The size of a subband j,k is in this case $n_{jk}=(512/2^j)^2$.
>
> Second Step: A total rate setting is allocated for all the subbands and this total rate setting is distributed among the various subbands.
>
> To assign the rate in each subband, the procedure is as follows:
>
> a) It is considered that the coefficients in each subband j,k are distributed according to a statistical distribution corresponding to a generalized Gaussian of parameters α and β. These parameters α and β are estimated, in a manner that will be described later, while minimizing the Kullback-Leibler distance between this statistical

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model and the empirical distribution of coefficients of each subband.

(paras. [0047]-[0053], with emphasis added through underlining). Falzon further states:

> To determine the parameters α and β, as indicated above, the relative entropy between this subband density model and the empirical density of this subband is minimized.
>
> It is recalled here that the relative entropy, or Kullback-Leibler distance, between two probability densities p_1 and p_2 is given by:
>
> ...
>
> In the sense of this Kullback-Leibler distance, the distribution p_2 which best tends toward the distribution p_1 is that which minimizes $D(p_1\|p_2)$.
>
> Note furthermore that to determine p_2 which minimizes $D(p_1\|p_2)$, for a fixed p_1, the following is minimized:
>
> ...
>
> As the first term of this difference does not depend on p_2, minimizing this sum in p_2 amounts to minimizing the second term of this sum, and therefore amounts to minimizing:
>
> ...
>
> If p_1 and p_2 are discrete distributions, the term above is then the average rate of coding of a source of symbols of probability distribution p_1, coded with optimum entropy symbols for a distribution p_2.
>
> Minimizing this term amounts therefore to choosing a model distribution p_2 which will produce the most efficient symbols for coding a distribution source p_1.
>
> Therefore $D(p_1\|p_2)$ will be minimized and not the reverse, $D(p_2\|p_1)$, since the Kullback-Leibler distance is not symmetric.

(paras. [0062]-[0069], with emphasis added through underlining). Thus, Falzon teaches selection of parameters α and β based on minimizing a distance between two subband density models.

The parameters α and β are used to assign a rate in each subband for compressing the image data. Falzon fails to teach, suggest, or describe selection of any constellation points at all. Falzon also fails to teach, suggest, or describe <u>maximizing</u> a minimum Kullback-Leibler distance. Therefore, Falzon fails to teach, suggest, or describe "the plurality of constellation points selected by maximizing a minimum Kullback-Leibler distance between the plurality of constellation points" as required by Claims 41, 49, and 57. As a result, Fette and Falzon fail to teach, suggest, or describe all of the limitations of Claims 41, 49, and 57.

An obviousness rejection cannot be properly maintained where the references used in the rejection do not disclose all of the recited claim elements. As a result, Applicants respectfully request withdrawal of the rejection of Claims 41, 49, and 57. Claims 42, 45-48, 50, 53-56, 58, and 61-75 depend from one of Claims 41, 49, or 57. Therefore, Applicants respectfully request withdrawal of the rejection of Claims 41, 42, 45-50, 53-58, and 61-75.

V.   <u>Rejection of Claims 47, 48, 55, and 56 Under 35 U.S.C. § 103(a)</u>

In Section 6 of the Office Action, Claims 47, 48, 55, and 56 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Fette, in view of Falzon, and further in view of US Patent No. 6,373,832 to Huang et al. (Huang). Applicants respectfully traverse the rejection of Claims 47, 48, 55, and 56 because Fette, Falzon, and Huang, alone and in combination fail to teach, suggest, or disclose all of the limitations of Claims 47, 48, 55, and 56.

Claim 47 recites in part:

> wherein the number of transmit antennas used in the transmitting is greater than one, and is determined from a message received over the wireless channel

Claim 55 recites in part:

> wherein the number of the plurality of transmit antennas used in transmitting the signal is greater than one, and is determined from a message received over the wireless channel

On pages 8-9 of the Office Action, the Examiner states:

> Regarding claims 47 and 48, the combination of Fette and Falzon disclose the method stated above. The combination does not disclose the number of transmit antennas is determined from a message received over a wireless channel. Huang discloses a communication method with enhanced multipath diversity. A transceiver sends a feedback signal indicating the number of useful signals being received and the first transceiver responds by selecting and using a desirable number of transmit antennas (abstract). This technique of the invention could be applied in both transmit directions (column 3, lines 24-41).

On page 9 of the Office Action, the Examiner similarly rejects claims 55 and 56. Thus, the Examiner agrees that Fette and Falzon fail to teach, suggest, or describe a "wherein the number of the plurality of transmit antennas used in transmitting the signal is greater than one, and is determined from a message received over the wireless channel" as required by Claims 47 and 55. The Examiner looks to Huang for this teaching. Applicants respectfully disagree that Huang provides any teaching of at least a "wherein the number of the plurality of transmit antennas ... is determined from a message received over the wireless channel" as required by Claims 47 and 55.

Huang states:

> A driving arrangement is provided for causing the first code division multiple access transceiver to use a relative few, e.g., one, of the plurality of antennas. When, however, <u>an indication is obtained that an adequate number of resolvable signals are likely not received at the rake arrangement of the second transceiver, a circuit switches the driving arrangement to cause the first transceiver to use more of the plurality of antennas.</u> In one implementation, the second transceiver sends a feedback signal indicating the number of useful signals being received and the first transceiver responds to the feedback signal by selecting and using a desirable number of transmit antennas.

(Abstract, with emphasis added through underlining) Huang further states:

> Feedback path 34 includes multiplexer 36, modulator 37, and antenna 38 in remote transmitter 32, as well as antenna 23,

> demodulator 24, and demultiplexer 25 in receiver 21 of local
> transceiver 11. In its initial portion, feedback path 34 is coupled in
> receiver 41 of remote transceiver 31 to searcher 35, which <u>provides
> to multiplexer 36 in transmitter 32 a signal representative of the
> number of resolvable signal versions.</u>

(Col. 4, lines 4-11, with emphasis added through underlining). Huang still further states:

> The searcher 35 must likewise detect all the delayed signal
> versions of each code. The receiver then <u>notifies the transmitter via
> the feedback path how many strong signals it is receiving,</u> and this
> number may be modified on the transmit side in response to the
> feedback via the adaptive switch and normalizer 18'.

(Col. 7, lines 19-25, with emphasis added through underlining). Thus, Huang teaches notification of a number of strong signals and a number of resolvable signals to possibly adjust a number of transmit antennas used. Huang fails to teach, suggest, or describe "wherein the number of the plurality of transmit antennas ... is determined from a message received over the wireless channel." Therefore, Huang, Fette, and Falzon all fail to teach, suggest, or describe all of the limitations of Claims 47 and 55.

An obviousness rejection cannot be properly maintained where the references used in the rejection do not disclose all of the recited claim elements. As a result, Applicants respectfully request withdrawal of the rejection of Claims 47 and 55. Claims 48 and 56 depend from one of Claims 47 and 55. Therefore, Applicants respectfully request withdrawal of the rejection of Claims 47, 48, 55, and 56.

Applicants believe that the present application is in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.
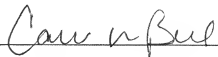
The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to

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Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a credit card payment form being in the wrong amount, post-dated, otherwise improper or informal, or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extension of time is needed for timely acceptance of papers submitted herewith, Applicants hereby petition for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extension fees to Deposit Account No. 19-0741.

Respectfully submitted,

Date September 17, 2007

By _____

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